INSTITUTION OF CIVIL ENGINEERS.

JUNE 4.—The President in the chair.

THE applicability of the system of the propulsion of railway carriages, by the pressure of the atmosphere upon a piston, travelling within an exhausted main, or line of pipes, has occupied a portion of three evening-meetings of the society; and although much time has been devoted to the discussion, it cannot be said that any positive conclusion has been arrived at. Indeed, when it is considered that the system has only been tried upon a line peculiar in its locality, in its steep gradients, in the engine having only to exert power in drawing the carriages in one direction, and their descending by their own gravity, and in the trains being only required to run a distance of a mile and three-quarters from end to end of the line, without stopping at any intermediate station, it must be argued, that although, as is evident from the testimony of the several speakers, extraordinary results have been obtained, it is scarcely possible to infer what the results would be on lines with gradients in both directions, with a great number of heavy trains at short intervals, and under all the varied circumstances of ordinary railway traffic.

It appeared, however, to be the general opinion, that the present system of atmospheric propulsion, as employed on the Kingstown and Dalkey Railway, although susceptible of much improvement, was in a more advanced state than the system of traction by locomotive engines, at a corresponding period from the date of the introduction of the several systems upon railways.

Messrs. Clegg and Samuda, the improvers and executers of the present atmosperic system, detailed the progress of the improvements, and in answer to questions from the members, reiterated the information which has been already published in the various reports of the examinations before the committee of the House of Commons on the Epsom Railway Bill, and which it is useless now to repeat.

The various previous plans of Medhurst, Vallance, and Pinkus, for somewhat similar systems, were explained, and it was shewn that the system had been taken up by Clegg and Samuda where the former speculators had abandoned it, and, as usual in such cases, the practical improvers had been more successful than the inventors.

The principal improvement was shewn to be in the continuous valve, and the mode of closing it by a mixture of tallow and bees'-wax, which, under all variations of temperature and seasons, remained unchanged, and enabled a good vacuum to be formed. Many other improvements in the mechanical details were also described at length.

Mr. Barry Gibbon, as engineer of the line, stated his satisfaction with the manner in which it worked. Thirty-five trains per day had at times been conveyed without danger, and with great regularity. The train was enabled to be started in one minute after the engine commenced working to form a vacuum. Mr. Samuda detailed the progressive trials of the system at Wormwood Scrubbs during two years and a half, until it was laid down at Dalkey, where a load of fifty tons had been propelled up gradients averaging 1 in 115, and a maximum velocity of nearly fifty miles per hour had been obtained, with an engine which was stated to be of 100 horse-power, using, as a divisor, 56,000lbs., raised one foot high in a minute. This deviation from the ordinary calculation of Boulton and Watt, who used 33,000lbs., was justified on the plea that steam-engines were now made in such a superior manner, that their effective power nearly doubled their nominal power, and that the usual acceptation of the term "horse-power" was no longer to be relied upon. This position was combated by several members, who argued that the commercial question should not be mixed up with the scientific inquiry; and that for the latter purpose the accepted divisor of 33,000lbs., as fixed by Boulton and Watt for the horse-power, should have been used, when the power exerted would have appeared nearly double what had been quoted, which would materially affect the question of the cost of first laying down a railway and the expense of subsequent working.

In considering the comparative questions of [illegible] engines, by friction [illegible] gines with ropes, and propulsion by the atmosphere, it was argued that, in the two former cases, the weight of the moving power must be carried along the rails at a corresponding cost and loss of power; added to which was the loss resulting from the slip of the driving-wheels, in the one case, and the friction of the rope against the pullies, in the other case. The destruction to the rails resulting from the beat of the driving-wheels being put out of the question. Against this it was argued, that with the atmospheric system the whole power of the engine must be used whether for heavy or light trains; that a power capable of pumping out the leakage, stated at ten horse-power per mile, must be always provided, although it was only exerted for a part of the length of each section; and that the real power employed at Dalkey, if calculated by the usual standard of Boulton and Watt, was shewn by Indicator diagrams to be nearly double what had been stated, and that, consequently, a greater outlay for power was required than was imagined.

The additional security in traversing the rapid curves of the railway at high speed appeared to be admitted. A curious circumstance was mentioned which deserved more attention; it was, that the temperature of the air on leaving exhausting air-pumps was increased to upwards of 200 degrees, and that there was a certain absorption of power consequent upon this increase of temperature. Our limits will not permit the whole, even of the heads of the discussion, to be detailed, and, although much time has been devoted to it, the question was not fully examined, nor were all the necessary data clearly stated; so that for all practical purposes we shall only arrive at the comparative value of the new system, after it has been applied to such a line as the Epsom, where, under the scrutinising care of Mr. Cubitt, the engineer of the line, there is no doubt of its merits being fairly tested; meanwhile the question remains open, and, as before, to be discussed as the interest or prejudices of parties may dictate.

The papers read were:—A description, by Mr. Rankine, Assoc. Inst. C.E., of a simple and ingenious safety drag, which has been applied to the carriages of the Edinburgh and Dalkeith Railway, for preventing accidents to the carriages in case of the fracture of the rope, by which they are drawn up the incline plane of 1 in 30. The drag consists of two cheeks of iron, united by rivets; it is attached at the end of an iron bar, and is suspended at the back of the carriage behind each hind wheel; when a retrograde motion commences, the drag falls beneath the wheel, and turning over, acts as a wedge between the wheel and the rail, and, by skidding the wheel, stops the downward progress of the carriage.

A description was also given by Mr. G. P. White, Assoc. Inst. C.E., of the mode of raising the Innisfall steamer, which was sunk in the river Lee, near Cork. It was accomplished by making a slight coffer-dam against one side of the vessel, and by pumping this out, the leak was arrived at; which being temporarily repaired, the vessel was enabled to be floated, and, at an expense of 350l., was saved from total loss.

A description was also given by Mr. W. Evill, Grad. Inst. C.E., of the corrugated iron roofs over the terminus of the Eastern Counties Railway; the drawings accompanying the description, which was necessarily of a purely technical character, were much eulogized by the president, and the members who examined them.

The president renewed his invitation to his conversazione of the 7th and 8th instant, at which many distinguished foreigners may be expected, and all models and works of art for exhibition were requested to be sent as quickly as possible.

Messrs. H. T. Wright, J. Reid, and J. L. Manby were elected as associates, and the following papers were announced to be read at the meeting of June 11th:—

No. 687. "On the purification of coal gas, and the application of the products thereby obtained to agricultural and other purposes." By A. A. Croll, Assoc. Inst. C. E.

No. 688. "On the means of rendering large supplies of water available in cases of fire, and on the application of manual power to the working of fire engines." By J. Braidwood, Assoc. Inst. C.E.

SOCIETY OF ANTIQUARIES.

MAY 2.—Lord Viscount Mahon, V.P., in the chair.

T. W. King, Esq., F.S.A. Rouge-Dragon Pursuivant of Arms, communicated some remarks upon the Stall-plates of the Order of the Garter, existing in St. George's Chapel at Windsor. It appears that, on an examination made in the year 1757, there were no plates for 146 of the ancient knights, and of those which exist many are not contemporary with the knights whose achievements they represent. Mr. King's remarks were directed first to the point of the shields of arms being surrounded by the garter, which is not the case in the oldest plates. The first so represented is that of the Duke of Burgundy, K.G., from 1469 to 1477. The plate of Lord Lovell, in 1 Richard III., is the first English subject whose arms are so encircled, and many of later date have no garter. The fashion became prevalent in the reign of Henry VII., and constant in the next reign. Mr. King remarked, secondly, upon the form of the helmet. The side-standing close helmet now assigned to the rank of esquire is found used by a peer (the Earl of Derby) in 13 Eliz., and by two other knights in the next reign. The barred-helmet is first used by a baron (Lord Knollys), in 1615, and gradually became universal with peers. This distinctive use of helmets appears, in fact, quite a modern notion, nearly, if not entirely, subsequent to the actual use of helmets in the field of battle.

MAY 9.—W. R. Hamilton, Esq., V.P., in the chair.

Extracts were read from a third letter of William Roots, Esq., to Mr. Hamilton, dated May 6, respecting the relics extracted from the Thames by the ballast-heavers near Walton. Two articles recently found are, a portion of a dagger or small sword, and a pocket-piece of Charles the First and Henrietta Maria. Mr. Roots is inclined to attribute the former to the same age as the latter, and thinks that both are memorials of the conflict on Surbiton Common, in which Lord Francis Villiers was killed, not a quarter of a mile from the place of their discovery.

The reading of Mr. King's paper on the Stall-plates of the Garter was concluded. His remarks were directed to—3. The use of coronets. Many earls and viscounts have no coronet in the reigns of Henry VIII. and Edward VI., and its use did not prevail until the beginning of Elizabeth's reign. 4. Supporters. Among the privileges of the Order of the Garter is that of using supporters, whether the knights are peers or not. Supporters are not, however, of high antiquity. The plate of the Marquis of Dorset (afterwards Duke of Somerset), K.G., in 20 Henry VI., which has supporters, is not contemporary. That of John Lord Dinham in 1 Henry VII. has supporters, which (as in many other ancient achievements) really support the helmet and crest, not the shield. But there are only five plates with supporters to the 29th Henry VIII., after which time they are universal.

Charles M. Joplin, Esq., communicated a memoir on the remains attributed to the Druids in the neighbourhood of Furness, in Lancashire. His descriptions were illustrated by several drawings, which represent—1. Various monuments at Stone Walls, Urswick, consisting of ruins of an oblong inclosure, a square one, a third of an extraordinary wheel-like form, and two cromlechs. 2. A temple of two circles of stones, called Sunbrick, at Birkrigg. 3. A circular temple or camp called the Kirk, at Kirkby Moor, accompanied by a cairn, which, on being opened, disclosed a tomb and a stone chest. 4. The Moot, at Aldingham, an artificial hill now situated on the brow of a high cliff above Morecambe Bay. 5. A British camp at Appleby Slack, Birkrigg; and, 6. Three stone hammers, or celts, found at Lindale and High Haume.

MAY 16.—Henry Hallam, Esq., V.P., in the chair.

The following gentlemen were elected Fellows of the Society:—Charles Tucker, Esq., of Harpsford, county of Devon; Major John Arthur Moore, of Queen Anne-street, and Frederick William Fairholt, Esq., of Grosvenor Cottage, Regent's Park.

Robert Porrett, Esq., F.S.A., exhibited a [illegible]